

REMARKS

Claims 1-8, 19, 20 and 31-36 are now pending in the present application. Claims 31-36 have been added and claims 9-18 and 21-30 have been canceled without prejudice or disclaimer of the subject matter contained therein. Claims 1, 19 and 20 are independent. Reconsideration of this application, as amended, is respectfully requested.

Election/Restriction

Claims 9-18 and 21-30 stand withdrawn from further consideration by the Examiner as being directed to a non-elected invention. As the Examiner will note, these claims have been canceled without prejudice or disclaimer of the subject matter contained therein. Applicants reserve the right to file a divisional application directed to these claims at a later date if it is so desired.

Rejections Under 35 U.S.C. §§ 102 and 103

Claims 1, 3, 4, 7, 8, 19 and 20 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Fuller et al. (U.S. Patent 3,962,487). Claims 2 and 5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fuller et al. Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over

Fuller et al. as applied to claims 2 or 3 above, and further in view of Itsuji (U.S. Patent 5,151,299). These rejections are respectfully traversed.

The present invention is directed to a method of applying viscous medium onto a substrate. Independent claim 1 recites a combination of steps including "add-on jetting of predetermined additional amounts of viscous medium on predetermined positions on the screen printed substrate." Independent claims 19 and 20 of the present invention are also directed to a method of applying viscous medium on a substrate, which recite the step of "jetting additional viscous medium onto the substrate." Applicants respectfully submit that the references relied on by the Examiner fail to teach or suggest the presently claimed invention.

Referring to the Fuller et al. patent, this patent is directed to a method for providing semiconductor elements with ohmic contact surfaces. The coating material used to form the ohmic contact surfaces is screen printed onto a ceramic body, column 3, lines 30-37, using any conventional screen printing apparatus. Then, the ceramic bodies provided with ohmic contact surfaces are fired at high temperature in air (see column 4, lines 3-7). In order to improve the solderability of the ohmic contact surfaces, they are further coated with a screen-printable metal contact material (see lines 27-32). Typically, this

additional coating is also performed by screen printing and could be performed either before or after the firing (see lines 41-50). Alternately, the additional coating is performed through flame-spraying (see lines 57-59). There is; however, no mention that the flame-spraying could be performed either before or after the firing.

Referring to the Examiner's Office Action, the Examiner alleges that the "flame-spraying" disclosed in Fuller et al., reads on the definition of "jetting" as defined in the present specification. Flame-spraying is a method of applying coatings of metals and ceramics onto metals and non-metal surfaces. Flame-spraying utilizes metal or ceramic powders, wires or rods that are converted into a molten particle spray. The spray is directed onto and mechanically bonds the substrate material. Attached hereto are printouts from www.flamespraydenver.com, which define flame-spraying and explain the various uses of flame-spraying. Applicants respectfully submit that the flame-spraying of Fuller et al. as defined in the attached printouts is not "jetting" as recited in the independent claims of the present invention.

The advantages obtained by using jetting for applying additional viscous medium, in comparison with the conventional methods, are that the added viscous medium:

1. Can be given any desired pattern;
2. Can be different from the screen-printed medium;
3. Can be given different height/thickness at different positions;
4. Can be given smaller dot sizes;
5. Can be placed at positions already provided with viscous medium;
and
6. Can be applied without requiring additional, costly stencil(s).

When comparing jetting to flame-spraying, it is evident that the viscous medium cannot be given any desired pattern when using flame-spraying. On the contrary, any selected application of medium on a substrate through flame-spraying would require the use of some sort of masking, i.e., similar to that of screen-printing, in order to prevent the spray from striking areas where no medium is to be applied. Furthermore, even though it might theoretically be possible to give the applied viscous medium different height/thickness at different positions, it would require even more masking, probably in the form of different stencils or masks for one substrate.

A further difference is that flame-spraying requires molten particles, obtained by melting metals or ceramics. When using jetting, the medium to be applied does not need to be melted. In fact, it is doubtful whether any of the

materials exemplified in the definition of viscous medium as stated in the present specification could be applied through flame-spraying.

In other words, using flame-spraying would not solve the stated problems of the present invention, e.g., the drawbacks of using stencils/maskings for providing desired patterns of viscous medium.

Referring to page 4, first full paragraph of the present specification, the term "jetting" is defined as "a non-contact dispensing process that utilizes a fluid jet to form and shoot droplets of a viscous medium from a jet nozzle onto a substrate, e.g. as described in the published International Application WO 99/64167, as compared to a contact dispensing process, such as 'fluid wetting', which is the act of the viscous medium leaving the dispense tip, contacting and clinging to the substrate and remaining on the substrate as the dispense tip pulls away." As should be understood, the definition of "jetting" was provided in the present specification to distinguish the process of "jetting" from the conventional contact dispensing processes. Applicants submit that one having ordinary skill in the art would readily understand the term "jetting" and that the flame-spraying of Fuller et al. would not be included within the scope of the term "jetting".

As can be clearly understood from a review of the WO '167 publication, jetting refers to the dispensing of droplets having a predetermined volume onto a substrate. This is quite different from flame-spraying, where droplets of material of a predetermined volume are not applied, but a spray of a particular material is applied to coat a surface of a substrate.

Also attached to the present Amendment is a definition of the term "jet dispensing" from "Fluid Dispensing Terms and Definitions" issued by SMEMA (The Surface Mount Equipment Manufacturers Association). In particular, paragraph 2.3 provides the definition of "jetting" or "jet dispensing." Under the definition of "jet dispensing" two types of jet dispensing, i.e., continuous jet and drop-on-demand jet are clearly defined. Applicants respectfully submit that one having ordinary skill in the art would readily understand that the "jetting" recited in the independent claims of the present invention does not encompass the flame-spraying disclosed by Fuller et al. and described in the printouts from www.flamespraydenver.com. In view of this, the Fuller et al. reference fails to anticipate any of the independent claims of the present invention.

With regard to dependent claims 2-8, Applicants respectfully submit that these claims are allowable due to their dependence upon allowable

independent claim 1, as well as due to the additional limitations recited in these claims.

The Examiner alleges that the realization of the solderability needing improvement reads on determining an error and improving the solderability reads on correcting it. Applicants submit that the Examiner's position is without basis. Dependent claim 3, for example, clearly recites the steps of "inspecting the results of said screen printing prior to said add-on jetting" and "determining errors of said screen printing based on said inspection." Although the Fuller et al. reference may disclose that soldering needs improvement after screen printing, this reference is entirely silent with regard to a positive step of inspecting the results of the screen printing prior to the add-on jetting and determining errors "based on said inspection" as recited in claim 3.

In Fuller et al., the realization of the solderability needing improvement is possibly a drawback of the applied medium. It cannot be regarded as a determined error in the application. If so, the realization would have to have had occurred prior to the screen-printing step, since the properties of the medium to be applied in all likelihood is known when the medium is selected. In accordance with the claimed invention; however, the determination is performed based on an inspection, i.e., after the inspection, which in turn must

be performed after the screen printing. In other words, any determination of an undesired solderability, as alleged by the Examiner, could in no respect be the result of an inspection.

With regard to the Examiner's reliance on the Itsuji reference, this reference also fails to disclose "add-on jetting of predetermined additional amounts of viscous medium on predetermined positions on the screen printed substrate" as recited in independent claim 1 and "jetting additional viscous medium onto the substrate" as recited in independent claims 19 and 20. Accordingly, the Itsuji reference fails to make up for the deficiencies of Fuller et al.

In view of the above remarks, Applicants respectfully submit that claims 1-8, 19 and 20 clearly define the present invention over the references relied upon by the Examiner. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. §§ 102 and 103 are respectfully requested.

Additional Claims

Additional claims 31-36 have been added for the Examiner's consideration. Applicants respectfully submit that these claims are allowable

due to their respective dependence upon independent claims 1, 19 and 20, as well as due to the additional recitations in these claims.

Favorable consideration and allowance of additional claims 31-36 are respectfully requested.

CONCLUSION

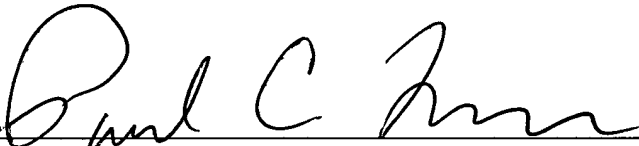
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Mr. Paul Lewis (Reg. No. 43,368) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Pursuant to the provisions of 37 C.F.R. §§ 1.17 and 1.136(a), the Applicant respectfully petitions for a one (1) month extension of time for filing a response in connection with the present application and the required fee of **\$55.00** is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.


Respectfully submitted,

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Attachments: Printout from www.flamespraydenver.com
Publication "Fluid Dispensing Terms and Definitions"